GENERAL INSTRUMENT
MOS TRANSISTOR

P CHANNEL–ENHANCEMENT MODE SILICON INSULATED GATE FIELD EFFECT TRANSISTOR

Technical Specifications
May, 1965

MEM 511
TENTATIVE

Silicon P-Channel, Insulated — Gate Enhancement Mode Field Effect Transistor Designed Primarily For Low-Power Audio, Radio Frequency and Commutating Applications.

FEATURES:

- 10^{10} ohms input resistance
- Integrated zener clamp — protects the gate
- Normally off with zero gate voltage
- Square Law linear transfer characteristics

APPLICATIONS:

- High input impedance amplifiers
- Series and shunt choppers
- Operational amplifiers
- Logic circuits
- RF and IF amplifiers

CASE STYLE:

See Drawing

MAXIMUM RATINGS:

($T_A = 25°C.$, unless otherwise specified)

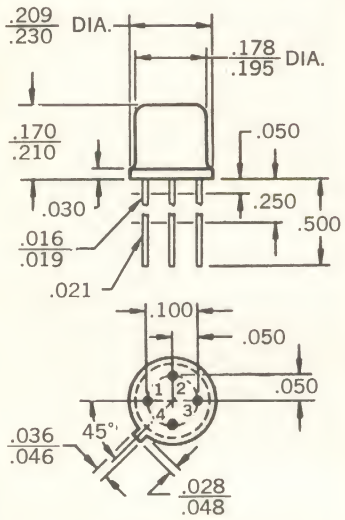
Drain to Source Voltage	−30V
Gate to Source Voltage	−30V
Gate to Drain Voltage	−30V
Drain Current	−50mA
Gate Current (Forward Direction for Zener Clamp)	+0.1mA
Storage Temperature	−50 to 150°C
Operating Junction Temperature	−50 to 125°C
Total Dissipation at 25°C Case Temperature	650mW
Total Dissipation at 25°C Ambient Temperature	225mW

ELECTRICAL CHARACTERISTICS:

($T_A = 25°C$, unless otherwise specified)

SYMBOL	CHARACTERISTIC	MIN.	TYP.	MAX.	UNITS	CONDITIONS
V_{GS}	Gate Source Cutoff Voltage	−3		−6	Volts	$V_{GS} = V_{DS}, I_D = 10\mu A$
I_{DSS}	Drain Leakage Current			10	na	$V_{DS} = -20V, V_{GS} = 0$
I_{GSS}	Gate Leakage Current			1	na	$V_{GS} = -15V, V_{DS} = 0$
$I_{D(on)}$	Drain Current	− 3			ma	$V_{GS} = V_{DS} = 10V$
BV_{DSS}	Drain-Source Breakdown	−30			Volts	$I_D = 10\mu A, V_{GS} = 0$
Y_{FS}	Transadmittance	1000 1000			μmho μmho	1KC, $V_{GS} = V_{DS} = 10V$ 10MC, $V_{GS} = V_{DS} = 10V$
C_{gs}	Gate to Source Capacitance			3	pf	$V_{GS} = V_{DS} = 10V$
C_{gd}	Gate to Drain Capacitance			2.5	pf	$V_{GS} = V_{DS} = 10V$
C_{ds}	Drain to Source Capacitance			2.0	pf	$V_{GS} = V_{DS} = 10V$
$r_{ds(on)}$	Drain to Source Resistance		250		ohms	$V_{GS} = -15V, I_{DS} = -1mA$

4 LEAD TO-18 TYPE PACKAGE



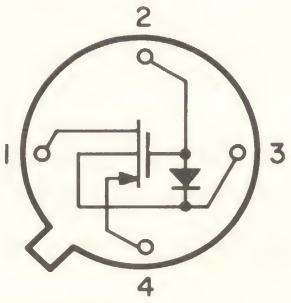
Bottom view

Note: All dimensions in inches.

TERMINAL DIAGRAM

Lead

1. Drain
2. Gate
3. Body (Case)
4. Source



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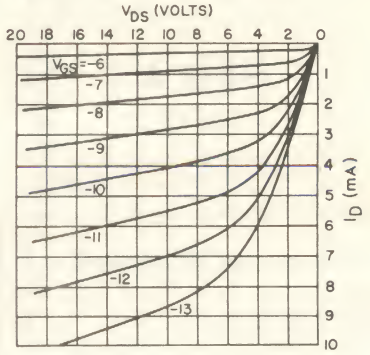
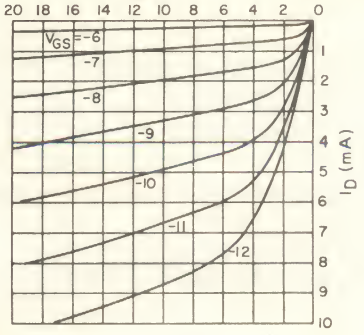
TYPICAL CHARACTERISTIC CURVES

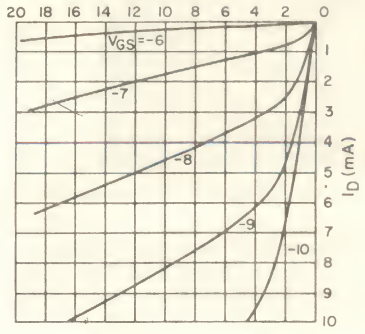
DRAIN CHARACTERISTICS AT +125°C



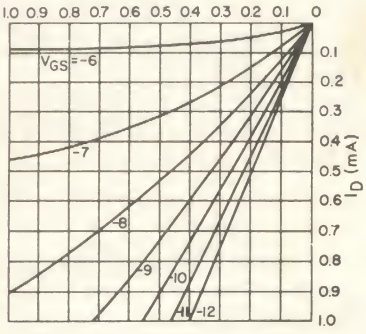
DRAIN CHARACTERISTICS AT 25 °C



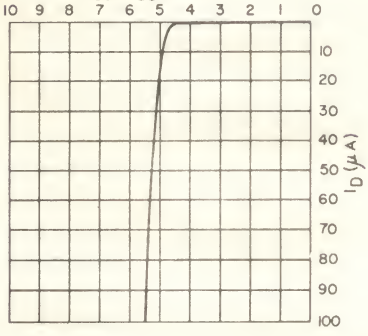
DRAIN CHARACTERISTICS AT -200 °C



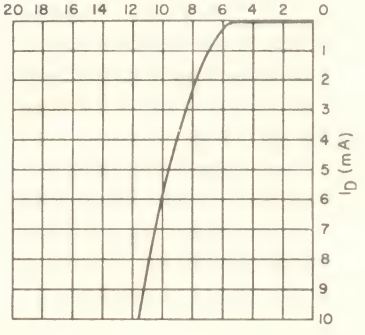
DRAIN CHARACTERISTICS AT 25 °C



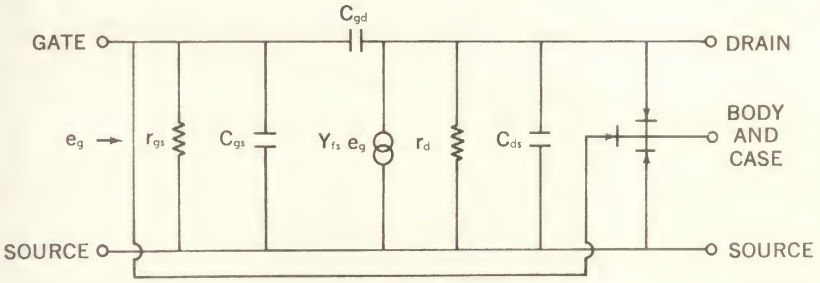
TURN-ON CHARACTERISTICS AT 25 °C



TURN-ON CHARACTERISTICS AT 25°C



SMALL SIGNAL EQUIVALENT CIRCUIT
(Conditions: $V_{GS} = V_{DS} = 10V$)



SYMBOL		TYPICAL VALUE	UNITS
Diodes	All diodes are to be considered perfect diodes		
r_{gs}	Gate to source leakage resistance and diode leakage resistance	10^{10}	ohms
r_d	Dynamic drain resistance	25	Kohms
C_{gs}	Gate to source capacitance	2.25	pf
C_{gd}	Gate to drain capacitance	1.5	pf
C_{ds}	Drain to source capacitance	1.25	pf
Y_{fs}	Forward transadmittance	2500	μmho

HANDLING PRECAUTIONS

The MEM 511 insulated gate field effect transistors have been designed with an integrated zener diode clamp from the high input resistance (10^{15} ohm typical) gate, to the body which is internally connected to the case. This clamp eliminates the detrimental effects of high electrostatic voltages on the gate that can be generated in normal handling.

It is recommended that the body (lead 3) be connected to the source (lead 4) for most applications.

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